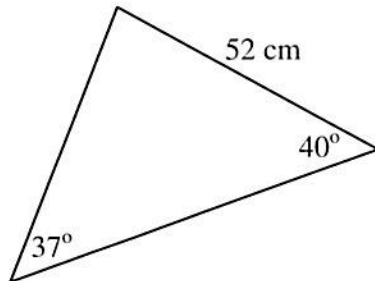


Name: \_\_\_\_\_ Date: \_\_\_\_\_  
 Mr. Carman Algebra 2/Trig H: The Normal Distribution

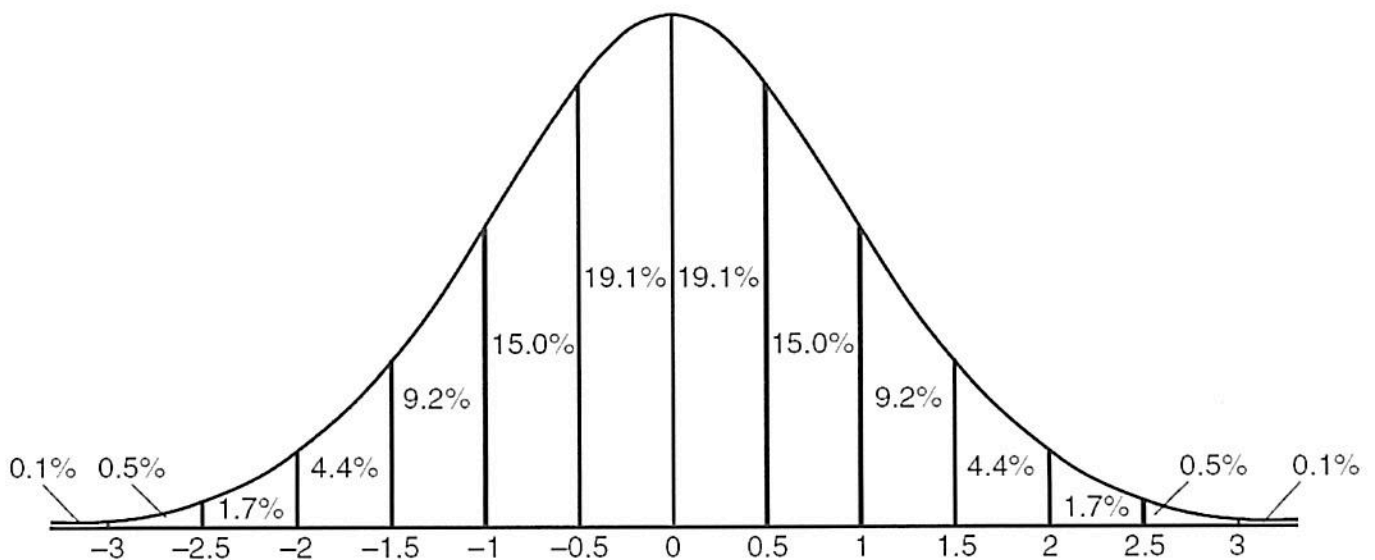
DO NOW: (Review) Find the area of the triangle below:



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 REMINDER: To reset your calculator's settings (Graphs, Tables, Statistics Data, etc) Use these steps:

- 1) Go to the home screen
  - 2) Press:  $2^{\text{nd}}$ , +, 7, 1, 2, (clear)
- 

### Normal Curve Standard Deviation



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1) Imagine that we measured the **height** of every high school student in the world...



2) Lots of **naturally occurring** data takes on this shape. We call this the **normal distribution**.

3) We need a way to describe **how far from the average** a person is. We use **standard deviations**.

4) In the normal distribution, the mean is at the \_\_\_\_\_ percentile.

5) Approximately \_\_\_\_\_% of the values in a normal distribution lie within one standard deviation of the mean.

6) Approximately \_\_\_\_\_% of the values in a normal distribution lie within two standard deviations of the mean.

7) Approximately \_\_\_\_\_% of the values in a normal distribution lie within three standard deviations of the mean.

\*\*\*These percentages may vary from book to book. Don't panic if your answer is not exact. Pick the closest one!

8) On a math test, Mr. Carman's student scored 2 standard deviations above the mean. What percentile is this?

9) Kris's SAT score is at the 84.1<sup>st</sup> percentile. How many standard deviations above the mean is her score?

“The trick to mastering the **normal distribution** is drawing a **number line**.”

- Mr. Carman; May 10, 2011

10) On a standardized test, the mean score is 70 and the standard deviation is 10. If you scored a 90 on this test, at what percentile is your score?

11) The heights of a sample of female students at RHS are normally distributed with a mean height of 64 inches and a standard deviation of 0.5 inches. What percent of the sample is between 63 inches and 64.5 inches?

12) To get into a certain college, you need to be in the top 6.7% on a standardized test. If the mean score is 80, and the standard deviation is 6.6, what score do you need to beat?

- 13) The weights of the boxes of animal crackers coming off an assembly line differ slightly and form a normal distribution whose mean is 9.8 ounces and whose standard deviation is 0.6 ounce. Determine the number of boxes of animal crackers in a shipment of 5,000 boxes that are expected to weigh *more than* 11 ounces.
- 14) Mr. Carman only gives A's to students who score in the top 15.9% of his class. If the mean score is 80, and the standard deviation is 4.9, what score do you need to beat in order to receive an A? (This story is fictional. Any resemblance between its characters and any real persons, living or deceased, is purely coincidental.)
- 15) The lengths of a batch of drumsticks is normally distributed with a mean of 16.3 inches, and a standard deviation of .2 inches. What percent of the drumsticks will be between 16.1 and 16.5 inches?
- 16) Appx \_\_\_\_\_% of the scores within a normal distribution lie within the interval  $\bar{x} \pm \sigma$
- 17) Appx \_\_\_\_\_% of the scores within a normal distribution lie within the interval  $\bar{x} \pm 2\sigma$
- 18) Appx \_\_\_\_\_% of the scores within a normal distribution lie within the interval  $\bar{x} \pm 3\sigma$

19) Mr. Carman has a bunny making machine. The weight of the bunnies is normally distributed with a mean of 20 ounces, and a standard deviation of 1.7 ounces.

a] What percent of the bunnies weigh less than 16.6 ounces?

b] In a sample of 500 bunnies, **how many** would weigh less than 16.6 ounces? (nearest tenth)

20) Ignatious posts lots of comments on Mr. Carman's wall. The length of each post is 5,000 letters, with a standard deviation of 8.2 letters.

a] What percent of the posts are longer than 5,012.3 letters long?

b] In a sample of 200 posts, **how many** would be longer than 5,012.3 letters long? (nearest tenth)

21) The heights of a sample of female students at Oriskany High School are normally distributed with a mean height of 65 inches and a standard deviation of 0.6 inch.

a] What percent of this sample is between 63.8 inches and 66.2 inches?

b] Above what height, in inches, would the top 2.3% of this sample population be found?

22) In a given normal distribution, about 2.3% of the values are at or below 45, and 2.3% are above 77.

a) Find the standard deviation

b) Find the mean

23) In a normal distribution,  $\bar{x} = 27.9$  and 16% of the values are at or below 25.2

a) Find  $\sigma$

b) Find  $\bar{x} + 2\sigma$

24) The lengths of 100 pipes have a normal distribution with a mean of 102.4 inches and a standard deviation of 0.2 inch. If one of the pipes measures exactly 102.1 inches, its length lies

- (1) below the 16<sup>th</sup> percentile
- (2) between the 16<sup>th</sup> and 50<sup>th</sup> percentiles
- (3) between the 50<sup>th</sup> and 84<sup>th</sup> percentiles
- (4) above the 84<sup>th</sup> percentile

